

CLAIMS

1. A fine metal structure having its surface furnished with microprojections, characterized in that the microprojections have a thickness or equivalent diameter ranging from 10 nanometers to 10 micrometers, and that the ratio of the equivalent diameter (D) to the height (H) of said microprojections, H/D , is greater than 1.
2. The fine metal structure according to Claim 1 wherein the microprojections contain a nonmetallic element as an accessory constituent.
3. The fine metal structure according to Claim 2 wherein the nonmetallic element is boron.
4. The fine metal structure according to Claim 2 wherein at least part of the surface of each microprojection is coated with at least one layer of coating.
5. The fine metal structure according to Claim 2 wherein at least one organic material selected from the group consisting of antigens, antibodies, proteins, bases, sugar chains and surface modifiers is fixed directly or indirectly to the surface of each microprojection.
6. A fine metal structure having its surface furnished with microprojections, characterized in that a molecular electroless plating catalyst is applied to the surface of a substrate having a fine rugged pattern, then electroless plating is carried out

thereon to form a metal layer, and this metal layer is detached from the substrate to thereby effect reversal transfer of the rugged pattern.

7. The fine metal structure according to Claim 6 having microprojections whose thickness or equivalent diameter is from 10 nanometers to 10 micrometers.

8. The fine metal structure according to Claim 7 wherein the ratio of the equivalent diameter (D) of the microprojections to their height (H), H/D , is greater than 1.

9. The fine metal structure according to Claim 7 wherein the microprojections are made of an alloy containing a nonmetallic element as an accessory constituent.

10. The fine metal structure according to Claim 7 wherein at least part of the surface of each microprojection is coated with at least one layer of coating.

11. The fine metal structure according to Claim 7 wherein at least one organic material selected from the group consisting of antigens, antibodies, proteins, bases, sugar chains and surface modifiers is fixed directly or indirectly to the surface of each microprojection.

12. A fine metal structure having its surface furnished with microprojections, characterized in that at least part of the surface of each microprojection is coated with at least one layer of coating having a

different composition from that of the microprojections.

13. The fine metal structure according to Claim 12 having a portion where the thickness or equivalent diameter of the microprojections is 10 nanometers to 10 micrometers.

14. The fine metal structure according to Claim 12 wherein the ratio of the equivalent diameter (D) of the microprojections to their height (H), H/D , is greater than 1.

15. The fine metal structure according to Claim 12 wherein the microprojections are made of an alloy containing a nonmetallic element as an accessory constituent.

16. The fine metal structure according to Claim 12 wherein at least one organic material selected from the group consisting of antigens, antibodies, proteins, bases, sugar chains and surface modifiers is fixed to the surface of the coating layer.

17. The fine metal structure according to Claim 12 wherein the material composing the coating layer is gold.

18. A process for producing a fine metal structure, which comprises providing a substrate having a fine rugged pattern on its surface, applying a molecular electroless plating catalyst to the substrate surface, thereafter carrying out electroless plating to form a metal layer having the rugged pattern filled,

and detaching the metal layer from the substrate to thereby obtain a fine metal structure furnished with a surface having undergone reversal transfer of the rugged pattern.

19. A process for producing a fine metal structure characterized in that after producing a fine metal structure according to the process of Claim 18, at least one layer of coating having a different composition from that of said fine metal structure is formed on the surface of said fine metal structure.

20. A process for producing a fine metal structure characterized in that after producing a fine metal structure according to the process of Claim 18, at least one organic material selected from the group consisting of antigens, antibodies, proteins, bases, sugar chains and surface modifiers is fixed at least at a part of said gold coating surface.

21. The process according to Claim 18 wherein the rugged surface configuration of said fine structure is at least partly constituted by cylindrical microprojections, with the diameter or the length of one side thereof being 10 nanometers to 10 micrometers, and the ratio of the diameter or length of one side (D) to the height (H) of the microprojections, H/D , is greater than 1.

22. A metal mold used for pressure molding of resins and inorganic materials, characterized in that the surface of the mold is constituted by the fine

metal structure set forth in Claim 1.

23. A nanoimprinter in which resins or inorganic materials are pressure molded by using a fine metal mold, characterized in that the surface of said fine metal mold is constituted by the fine metal structure set forth in Claim 1.

24. An electrode for converting, producing or detecting the materials by an electrochemical reaction, characterized in that at least part of the surface of the electrode is constituted by the fine metal structure set forth in Claim 1.

25. A microchip having a fine ruggedness at the specimen detecting section, characterized in that the fine metal structure set forth in Claim 1 is used for the detecting section.

26. A microchip in which a material interacting with the specimen is fixed to the surface of a substrate, characterized in that the fine metal structure set forth in Claim 1 is used as said substrate.

27. A DNA chip having many types of DNA fixed to the substrate surface, characterized in that the fine metal structure set forth in Claim 1 is used as the substrate.